

B3 A marked-up version of the amended claims is enclosed as required by 37 C.F.R.

§ 1.121.

REMARKS

The Office Action dated July 16, 2002 has been received and carefully noted. The above amendments and the following remarks are submitted as a full and complete response thereto. By this Amendment, claim 7 has amended. No new matter is added. Accordingly, claims 1-10 are pending and submitted for consideration.

The Office Action objected to the specification citing various informalities. Although the Applicants are of the opinion that the various acronyms are well known in the art, see for example U.S. 2001/0009160 to Otani et al. (cited by the Examiner), by this amendment, the specification is amended to correct these informalities. No new matter is added. Thus, Applicant respectfully request the withdrawal of the objection to the specification.

The Office Action rejected claim 7 under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 7 has been amended to more particularly point out and distinctly claim the invention. Therefore, the rejection is requested to be withdrawn.

Claims 1-3 and 7 were rejected under 35 U.S.C § 102(e) as being anticipated by Yamagishi et al. (U.S. Patent No. 6,300,556). The Office Action took the position that Yamagishi discloses all the elements of the claimed invention. However, Applicants respectfully submit that claims 1-3 and 7 recite subject matter that is neither disclosed nor suggested in the prior art.

Claim 1 is directed to a solar cell module. The module includes a light transmitting member on a front surface side containing at least sodium and a rear surface resin film. A plurality of solar cell elements are sealed with sealing resin between the light transmitting

member on the front surface side and the rear surface resin film. A water transmission preventing layer is arranged in a position including at least an interval part between the solar cell elements adjacent each other.

The Office Action took the position that Yamagishi discloses all of the elements of the claimed invention. However, it is respectfully submitted that the prior art fails to disclose or suggest the structure of the claimed invention, and therefore, fails to provide the advantages of the present invention. For example, the solar cell module of the present invention includes a rear surface resin film and a water transmission layer arranged in a position including at least an interval part between the solar cell elements adjacent each other. As discussed generally in Applicants' specification, a benefit of this claimed configuration is that water entering through the rear surface resin film is blocked.

Yamagishi is directed to a thin film solar cell module that comprises a transparent first electrode layer, a semiconductor layer and a second electrode layer. These layers are deposited on a substrate such as glass and part of the layers are worked by means of a laser beam to thereby partition the layers into a plurality of cells which are then electrically connected with each other. The solar cell module is sealed using ethylene-vinyl acetate copolymer (EVA) thus making it possible to substantially prevent water from penetrating through a peripheral portion of the substrate.

Although Yamagishi appears to disclose a solar cell module, Yamagishi discloses only a rear surface resin. This design is inadequate to prevent water leakage. However, contrary to this, the present invention includes a separate rear surface resin film and a separate water transmission prevention layer. This configuration provides sufficient waterproofing. Additionally, Yamagishi fails to disclose or suggest that the water

transmission preventing layer is arranged in a position including at least an interval part between the solar cell elements adjacent each other.

Thus, as discussed above, Yamagishi fails to disclose or suggest a solar cell module having a rear surface resin film and a water transmission preventing. Therefore, it is respectfully submitted that Applicants' invention, as set forth in claim 1 is not anticipated by Yamagishi within the meaning of 35 U.S.C. § 102.

As claims 2, 3 and 7 depend from claim 1, Applicants respectfully submit that each of these claims incorporate the patentable aspects thereof, and are therefore allowable for at least the same reasons as discussed above.

Claims 1-3 and 7 were rejected under 35 U.S.C. § 102(e) as being anticipated by Kondo (U.S. Patent No. 6,271,053). In the Office Action it was asserted that Yamagishi discloses all the elements of the claimed invention. However, Applicants traverse the rejection and respectfully submit that claims 1-3 and 7 recite subject matter that is neither disclosed nor suggested in the prior art.

Kondo discloses a thin film solar battery module having a plurality of unit cells formed on a substrate. The solar cell comprises a tin oxide film 2 formed on a glass substrate made of soda lime glass, an a-Si layer patterned on the oxide film layer, and a protective film 9. In making this rejection, the Office Action asserted that the rear surface resin film 9 also serves as the water transmission preventing layer.

Kondo also only discloses a rear surface resin. However, as discussed above, the present invention includes a separate rear surface resin film and water transmission layer. Therefore, Kondo also fails to disclose or suggest a solar cell module having a separate rear surface resin film and water transmission preventing layer. Thus, it is respectfully

submitted that Applicants' invention, as set forth in claim 1 is not anticipated by Kondo within the meaning of 35 U.S.C. § 102.

As claims 2, 3 and 7 depend from claim 1, Applicants respectfully submit that each of these claims incorporate the patentable aspects thereof, and are therefore allowable for at least the same reasons as discussed above.

Claims 4 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Otani et al. (PG-PUB-2001/0009160, "Otani"). In making this rejection, the Office Action took the position that Yamagishi discloses all of the elements of the claimed invention, except for disclosing the use of an inorganic oxide layer, a nitride layer, or a fluoride layer formed on a surface of the rear surface resin film, as recited by claim 4, or that the water transmission preventing layer is the rear surface resin film with the water vapor transmission rate not higher than 6.3g/m^2 day, as recited by claim 9. Otani is cited for disclosing these limitations.

Otani discloses a covering member for a solar battery. A transparent high-moisture film 12 includes a transparent base film 12A and a moistureproof layer 12B made of an inorganic oxide. High-moisture film 12 is provided in the covering member 11. The covering member is used on the light incident side as a substitute for the glass.

With respect to the limitation of claim 4, the Office Action took the position that it would have been obvious to provide Yamagishi with the inorganic layer of Otani because it is preferably used as a moistureproof layer over metal layers to prevent current leakage.

However, it was asserted in the Office Action that the rear resin surface film of Yamagishi also functions as the water transmission preventing layer. There is no teaching or suggestion that the moistureproof layer of Otani is preferable over that of Yamagishi.

Therefore, it appears that the proposed modification is due to impermissible hindsight reasoning because the only reason for making the modification is due to Applicants' disclosure.

Thus, it is respectfully submitted that Applicants' invention, as set forth in claims 4 and 9 is not obvious in view of Yamagishi or Otani within the meaning of 35 U.S.C. § 103.

Additionally, because claims 4 and 9 depend directly from claim 1, Applicants submit that each of these claims recite subject matter that is neither disclosed nor suggested by the cited prior art, for at least the reasons set forth with respect to claim 1.

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Jansen et al. (U.S. Patent No. 6,077,722, "Jansen"). In making this rejection, the Office Action took the position that Yamagishi discloses all of the elements of the claimed invention, except for disclosing that the water transmission preventing layer is a plate glass bonded on a surface of the rear surface resin film. Jansen is cited for curing this deficiency.

Jansen discloses a monolithic photovoltaic module which comprises a single junction solar cell. The solar cell has a generally planar or flat shape, and a light transmissive substrate is provided for the front glass of the photovoltaic module. The substrate has an external surface and an inwardly facing inner surface and comprises a sodium-containing glass. It was alleged that Jansen teaches the use of a glass rear layer 44 bonded to a rear resin surface film 46, to "provide enhanced environmental protection for the photovoltaic module." It was further alleged that it would have been obvious to use the glass water transmission preventing layer taught by Jansen because the glass would provide the enhanced environmental protection.

However, it was asserted in the Office Action that Yamagishi's rear surface resin film also functions as the water transmission preventing layer. Therefore, it is unclear as to why one of ordinary skill in the art would be compelled to replace the water transmission preventing layer of Yamagishi, as suggested, with the glass water transmission preventing layer, as taught by Jansen. It appears that this modification is due to hindsight reasoning because the only reason for the modification is taken from the Applicants' specification.

Accordingly, as discussed above, Applicants submit that Yamagishi and Jansen, either alone or in combination, fail to disclose or suggest the claimed invention.

Therefore, it is respectfully submitted that Applicants' invention, as set forth in claim 1 is not obvious in view of the combination of Yamagishi and Jansen within the meaning of 35 U.S.C. § 103.

Further, because claim 5 is dependent on claim 1, Applicants submit that claim 5 recites subject matter that is neither disclosed nor suggested by the cited prior art, for at least the same reasons as claim 1.

Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Haigh et al. (U.S. Patent No. 6,265,653, "Haigh"). In making this rejection, the Office Action took the position that Yamagishi discloses all the elements of the claimed invention, except for disclosing that the water transmission preventing layer is formed on a plane with the solar cell elements. Haigh is cited for teaching this limitation.

Haigh discloses an array of photovoltaic cells connected in series, which are electrically isolated from others of the array located on a monolithic semi-insulating substrate. The photovoltaic cells include interconnected array of cells, interconnected substrates, and reflective coatings on the substrate between each cell. A reflective coating

is placed over an insulator layer, usually adjacent to the exposed surface of a semi-insulating substrate common to all or a majority of the cells.

The Office Action took the position that it would have been obvious to one of ordinary skill in the art to have the water transmission layer formed on a plane with the solar cell elements because making the modules with water transmission preventing layers on a plane with the solar cell elements would provide protection against water and would also electrically isolate the solar cells from each other, as taught by Haigh. Although the Office Action refers to column 4, lines 33 and 57 and Figure 5 of Haigh as disclosing this limitation, it appears that the proposed modification is due to impermissible hindsight because there is no motivation taught in the prior art for moving the water prevention layer of Yamagishi to the location suggested by Haigh, other than the Applicants' specification.

Therefore, it is respectfully submitted that Applicants' invention, as set forth in claim 6 is not obvious in view of any combination of Yamagishi or Haigh within the meaning of 35 U.S.C. § 103.

Additionally, because claim 6 depends directly from claim 1, Applicants submit that each of these claims recite subject matter that is neither disclosed nor suggested by the cited prior art, for at least the reasons set forth with respect to claim 1.

Claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Matsushita et al. (U.S. Patent No. 6,222,118, "Matsushita"). In making this rejection, the Office Action asserted that Matsushita discloses all the elements of the claimed invention, except for disclosing that the water transmission preventing layer is provided in a position corresponding to a position between the solar cell elements on an outer side of the rear surface resin film. Matsushita is cited for disclosing this limitation.

Matsushita discloses a semiconductor device and a plurality of solar cell batteries provided between a first substrate and a second substrate. The cell comprises elements 56 and 57 provided on the outer side of substrates 21 and 22. The substrates are comprised of paper or cloth. This design prevents the substrates from absorbing water.

The Office Action took the position that it would have been obvious to modify the solar cell modules of Yamagishi to use the water transmission preventing layers on an outer side of the rear surface resin film because having a water transmission preventing layer on an outer side of the rear film would prevent the rear film from absorbing water, as taught by Matsushita.

However, it was asserted in the Office Action that the rear surface resin film of Yamagishi also functions as the water transmission prevention layer. Thus, it appears that modifying the solar cell modules of Yamagishi to use the water transmission preventing layers on an outer side of the rear surface resin film in the manner suggested would change the principle of operation of Yamagishi.

Therefore, it is respectfully submitted that Applicants' invention, as set forth in claim 6 is not obvious in view of any combination of Yamagishi or Matsushita within the meaning of 35 U.S.C. § 103.

Further, as claim 8 depends from claim 1, Applicants respectfully submit that claim 8 incorporates the patentable aspects thereof, and is therefore allowable for at least the same reasons as discussed above.

Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi in view of Van Andel et al. (U.S. Patent No. 6,184,057, "Van Andel") and Pollard (U.S. Patent No. 6,034,322). In making this rejection the Office Action took the position that

Yamagishi discloses all the elements of the claimed invention, except for disclosing the use of a glass plate having a thickness of .005 to 0.1 mm as a water transmission preventing layer. Pollard and Van Andel are cited for teaching this limitation.

Van Andel discloses a method of manufacturing a photovoltaic cell. The cell is provided with a glass layer that serves as a protective window for the transparent conductor layer. However, in Yamagishi, the surface member 1 serves as a protective window for the transparent conductor layer.

Pollard discloses a solar cell assembly having a protective glass sheet bonded to an opposed surface of the solar cell and the bypass diode. However, the glass sheet in Pollard corresponds to the surface member 1 of Yamagishi because it is positioned on the light incident side.

The Office Action took the position that it would have been obvious to one of ordinary skill in the art to modify Yamagishi with the glass layer of Van Andel and Pollard for the purpose of having a glass layer based on the desired properties, such as increased structural strength and decreased weight.

However, upon review of both Van Andel and Pollard, it appears that this modification is also due to impermissible hindsight reasoning because the only reason for the modification is taken from the Applicants' specification. There is no motivation for making the water transmission prevention layer of Yamagishi a glass plate having a thickness of 0.005 -0.1 mm, other than the Applicants' specification. Therefore, we are of the opinion that we can traverse this rejection for at least this reason. However, we would welcome comments from you as to why this modification would not have been obvious.

Additionally, because claim 10 depends directly from claim 1, Applicants submit that

each of these claims recite subject matter that is neither disclosed nor suggested by the cited prior art, for at least the reasons set forth with respect to claim 1.

Furthermore, the Office asserted in the "Response to Argument" section that because claim 9 recites that the water transmission layer is the rear surface resin film, both Yamagishi and Kondo anticipate the invention. However, as claim 9 serves to further limit claim 1, claim 9 cannot be used to read limitations into claim 1. Thus, this is an improper rejection.

Claims 1-9 are also provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of the co-pending Patent Application No. 09/788,339 in view of the references cited above, Yamagishi, Otani, Jansen, Haigh and Matsushita.

Applicants respectfully submit that this rejection is moot in light of the duly executed terminal disclaimer submitted herein. Therefore, Applicants request that the rejection be withdrawn.

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of claims 1-10, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with

U.S. Patent Application S. N. 09/772,994

any additional fees that may be due with respect to this paper, may be charged to counsel's

Deposit Account No. 01-2300, referencing docket number 107336-00016.

Respectfully submitted,
ARENT FOX KINTNER PLOTKIN & KAHN PLLC

A handwritten signature in black ink, appearing to read "Lynne D. Anderson".

Lynne D. Anderson
Attorney for Applicants
Registration No. 46,412

Enclosures: Terminal Disclaimer
Marked-up Version of Claims
Marked-up Copy of Specification
Petition for Extension of Time

1050 Connecticut Avenue, NW, Suite 400
Washington, DC 20036-5339
Telephone: (202) 857-6000

CMM:LDA/epb

MARKED-UP COPY OF SPECIFICATION

Please replace on Page 9, lines 1-18 with the following paragraph:

As shown in Fig. 1, the solar cell element 1 includes an n-type single crystalline silicon substrate 10, an intrinsic amorphous silicon layer 11, and a p-type amorphous silicon layer 12 formed in this order. A transparent electrode 13 on a light receiving side formed of ITO [(Iridium Tin Oxide)] (Indium Tin Oxide) is formed on an entire surface of the p-type amorphous silicon layer 12, and a comb-shaped collector 14 of silver (Ag) or the like is formed on the transparent electrode 13 on a light receiving side. A rear surface of the substrate 10 has a BSF (Back Surface Field) structure which introduces an internal electric field on the rear surface of the substrate; a high dope n-type amorphous silicon layer 16 is formed with an intrinsic amorphous silicon layer 15 interposed on a rear surface side of the substrate 10. A transparent electrode 17 on a rear surface side formed of ITO is formed on an entire surface of the high dope n-type amorphous silicon layer 16, and a comb-shaped collector 18 of silver (Ag) or the like is formed thereon. The rear surface also has a BSF structure which the intrinsic amorphous silicon layer is sandwiched between the crystalline silicon substrate and a high dope amorphous silicon layer in order to reduce defects on the interface and improve characteristics of the hetero junction interface.

Please replace the Page 11, lines 16-22 with the following paragraph:

Heat resistance films of PVF (polyvinyl fluoride), PVDF (polyvinylidene Fluoride), FEP (fluoropropylene-copolymer), ETFE (2-ethylene-4-fluoroethylene-copolymer), PC (poly carbonate), PVC (polyvinyl chloride), PMMA (polymethylmethacrylate), other than PET (polyethylene terephthalate) can be used as the rear surface resin film 5. The water

transmission preventing layer 7a is formed by depositing inorganic oxide (aluminum oxide, silicon oxide), nitride (SiN), fluoride (HgF, CaF) or the like on the heat resistance film. Because of water barrier property provided with the inorganic oxide, the layer 7a can function for preventing water transmission.

MARKED-UP VERSION OF CLAIMS

Please amend claims 5 and 9 as follows:

7. (Amended) The solar cell module according to claim 1, wherein the water transmission preventing layer is formed so as to cover the interval part between the solar cell elements [in the sealing resin].